



The Erosion Control Pickle



Today's Topics:

- **NPDES - National Pollution Discharge Elimination System**
 - Other DOT's
 - NCDOT
- **New Erosion Control Technology**
- **New EC Design Requirements**
- **Future Initiatives**







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Environmental Compliance

Other State DOT's in NPDES Compliance "Pickle"

- Ohio
- Tennessee
- Hawaii
- California





Environmental Compliance

National DOT Compliance Triggers:

- NEPA/SEPA Processes
- Environmental Permitting
- Sedimentation and Erosion Control Program
- National Pollutant Discharge Elimination System
 - Sedimentation and Erosion Control Program



Environmental Compliance

ODOT's NPDES Compliance "Pickle"

- Beginning in 2004, Contractor responsible for all Erosion and Sediment Control compliance including plan design, installation, maintenance, and monitoring.
- In 2005, 4 projects received NOV's for non-compliance.

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Environmental Compliance

ODOT's NPDES Compliance "Pickle"

- 2005 - Ohio EPA issued "Findings and Orders" associated with Erosion and Sedimentation/NPDES NOV's.
- Lancaster Bypass - \$21,000 fine
- State Route 161 and I-270 - \$46,280 fine



Environmental Compliance

ODOT's NPDES Compliance "Pickle"

- Revising contract language:
 - E.C. plans must be stamped by P.E. or CPESC
 - Inspectors must have CPESC certification
 - Contractor still responsible for compliance



Environmental Compliance

TNDOT's NPDES Compliance "Pickle"

- Environmental advocacy group involvement
- Information listed on Southern Environmental Law Center web site reads:

"For years, the Tennessee Department of Transportation's aggressive highway building damaged the environment, public health and many communities...."

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Environmental Compliance

TNDOT's NPDES Compliance "Pickle"

- Information listed on Southern Environmental Law Center web site reads:

"On one project outside Nashville, TDOT and its contractors buried streams and springs in mud, temporarily shut down a public water supply, and were fined millions of dollars."



Environmental Compliance

TNDOT's NPDES Compliance "Pickle"

- March 2004 - Consent Order and Agreement with Tennessee Department of Environment and Conservation.
- Order was in response to numerous violations that occurred for failure to install and maintain proper erosion prevention and sediment controls.



Environmental Compliance

TNDOT's NPDES Compliance "Pickle"

- \$800,000 in Civil Penalties
- Consent Order costs may exceed \$10 million.



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Environmental Compliance

HDOT's NPDES Compliance "Pickle"

- The Honolulu Adviser reported on Sept. 7, 2005:

"The state Department of Transportation has agreed to pay \$52 million in one of the nation's largest stormwater violation settlements."





Environmental Compliance

HDOT's NPDES Compliance "Pickle"

- EPA issued several orders against HDOT in 1999, 2000, and 2002.
- Federal consent decree announced by the U.S. Environmental Protection Agency October 2005
- \$1 million penalty, \$1 million to be spent on a new system to oversee environmental issues in the department and \$60,000 for training construction contractors



Environmental Compliance

CALTRAN's NPDES Compliance "Pickle"

- The California Coastal Coalition reported on April 8, 2005:

"After a decade of battling environmentalists, Caltrans agreed in court to install pollution controls on state highways to reduce the flow of toxic stormwater into streams, rivers and ocean."

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Environmental Compliance

CALTRAN's NPDES Compliance "Pickle"

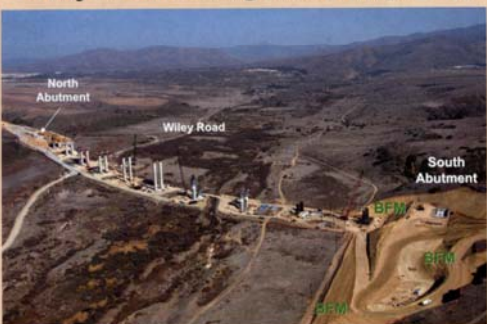
- Lawsuit - Natural Resources Defense Council, EPA, and other environmental advocacy groups.
- Pollution controls in Los Angeles County alone could approach \$5 billion for 900 miles of roads and 35 maintenance facilities.



Otay Lakes Road Looking North



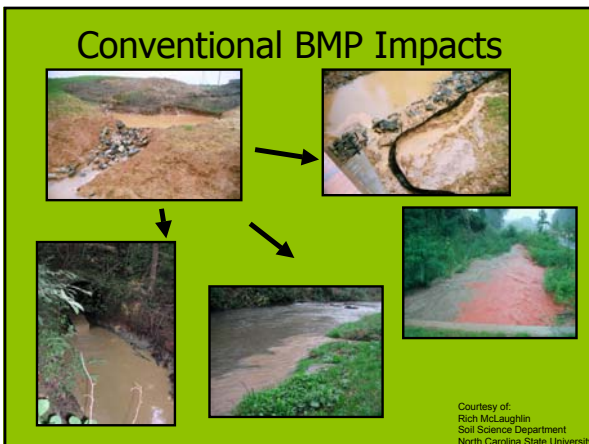
Otay River Bridge Looking East



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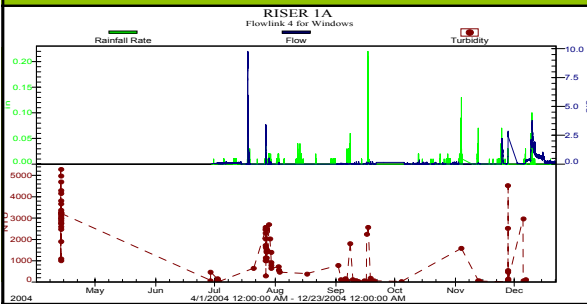
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Perforated Riser Basin



Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University

Turbidity from Riser Basin



Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University



Environmental Compliance

Innovation in Erosion Control
Design Changes

Old Design Standards

- 1800 Cubic Feet/ Dis Acre
- Rock Outlets
- Disturbed Area Only

New Design Standards

- 3600 Cubic Feet/ Dis Acre
- Surface Area
- Total Drainage Area
- Skimmer Outlets
- Baffles
- Turbidity Reduction
Chemical Treatment
(Polyacrylamide)

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Flashboard Riser Outlet

- Adjustable standing pool
- Can empty for sediment removal



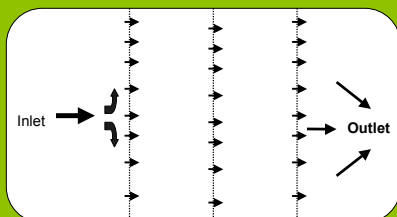
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Rich McLaughlin
Soil Science Department
North Carolina State University

Innovation in Erosion Control



Baffles

Flow in a Porous Baffle



Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University

The Erosion Control Pickle

Baffles

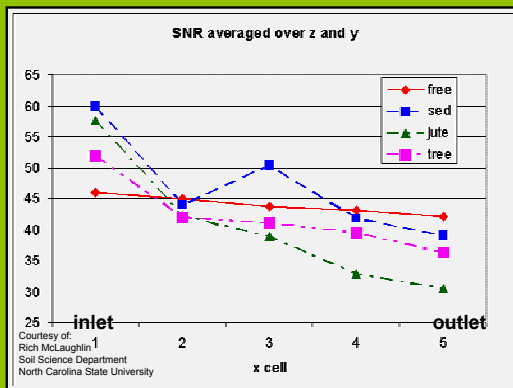
Porous



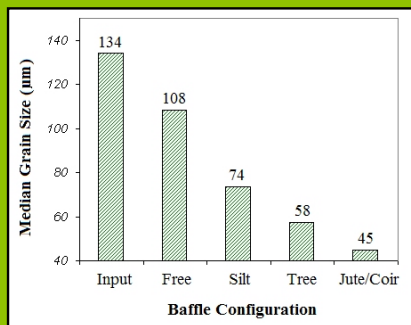
Silt Fence/Weir



Effects of Baffles: Turbulence



Effects of Baffles: Grain Capture



Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University

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Improvement from Surface Outlet/Porous Baffles

- May increase sediment capture from 60% to 90%.
- This will increase maintenance needs.
- Turbidity will still be an issue



Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University



Environmental Compliance



Basins designed with Forebays, Baffles, Skimmers, and Emergency Spillway



Infiltration?

- Possible in some soils.
- May be able to construct infiltration areas.
- Doubtful for most situations.



Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University

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Chemical Treatment for Turbidity

- Polyacrylamide (PAM) is very common in water treatment, industrial processes.
- 1-2 mg/L will usually be the maximum required.
- Other chemicals: gypsum/alum (need high doses), chitosan (very expensive), inorganics (higher doses).

Courtesy of:
Rich McLaughlin
Soil Science Department
North Carolina State University

PAM...

- High molecular weight ($12-17 \text{ Mg mol}^{-1}$)
- Forms: dry powder, solution, emulsion, logs



Courtesy of:
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Soil Science Department
North Carolina State University

PAM Flocculation: 10 seconds



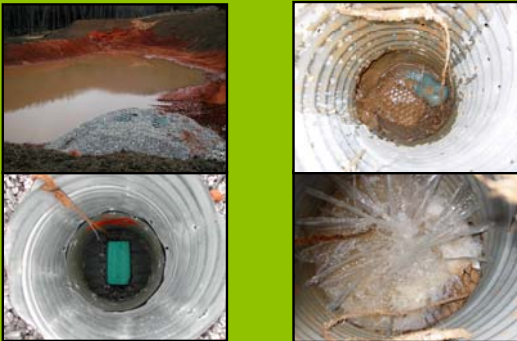
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Solid PAM Blocks



Riser Barrel – Great Log Location...



Passive PAM Solution Dosing



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Other Passive Approaches



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PAM + Sediment Bag



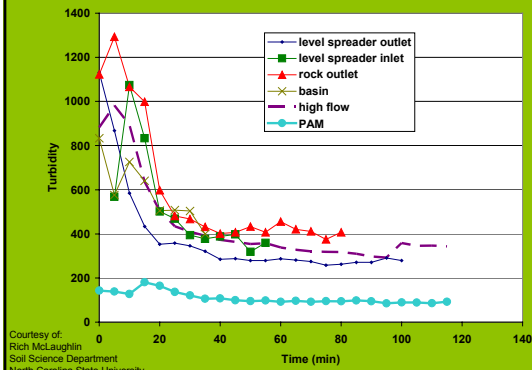
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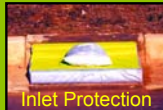
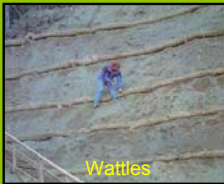
PAM Effects: Controlled Conditions





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Innovation in Erosion Control





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Sometimes Even When We Try
Our Hardest...

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What is Next?

Build a Water Treatment Plant



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Specification Revisions

- Section 1675 Response For Erosion Control
- Incentives for Environmental Compliance



Environmental Compliance

Innovation in Erosion Control

Specification Revisions

Incentives for Environmental Compliance
for Design Build Projects

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Environmental Compliance
Erosion Control and Stormwater Certification




Certified?



Environmental Compliance

- Florida
- Georgia
- Minnesota
- North Carolina
- Ohio

- South Carolina
- Tennessee
- Virginia
- Washington



Environmental Compliance

Beginning Date

• **Level I: Inspector / Installer** *(required for each)* **Jan. - 07**
 Seeding / mulching operations
 Erosion control installation
 Pipe installation in jurisdictional waters

• **Level II: Site Management** *(required for each)* **Jan. - 06**
 Grading operations
 Bridge / culvert construction
 Utility operations

• **Level III: Designer** **Future**
 E / SC Plan Design

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Environmental Compliance

Number of Certified in NC	% passing exams
Level II - 1200	88.5 (closed book)
Level I - 48 (1class)	94 (open book)



Environmental Compliance

2005 NCDOT Received One NOV

- DWQ Issued NOV in October
- Violations Included:
 - Sediment in creek
 - Manage project runoff through measures
 - Fish kill as result of pond dewatering



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Environmental Compliance





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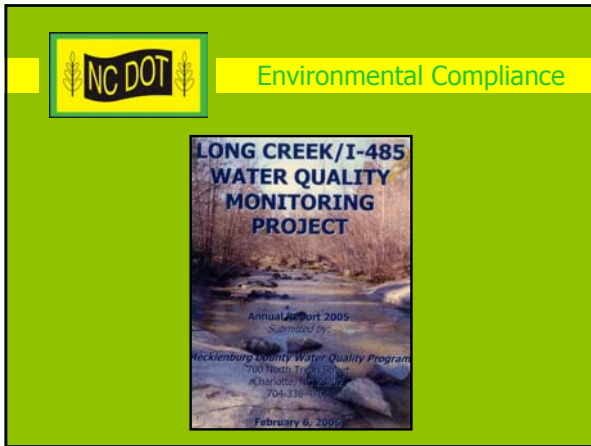





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Environmental Compliance

Executive Summary

- Out of 336,029 turbidity measurements taken in 2005, only 195 were Action Threshold exceedances
- Out of these 195 exceedances, 30 were a result of specific erosion control problem areas
- Out of the 30 erosion control problems, 16 were attributed to Mecklenburg County (Long Creek Sewer Project and Pine Island Golf Course) and 14 were attributed to NCDOT
- "Water quality data collected for this project indicates that the NCDOT has done an excellent job of preventing sediment from leaving the I-485 construction site and minimizing negative impacts to the streams in the Long Creek watershed during 2005"



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